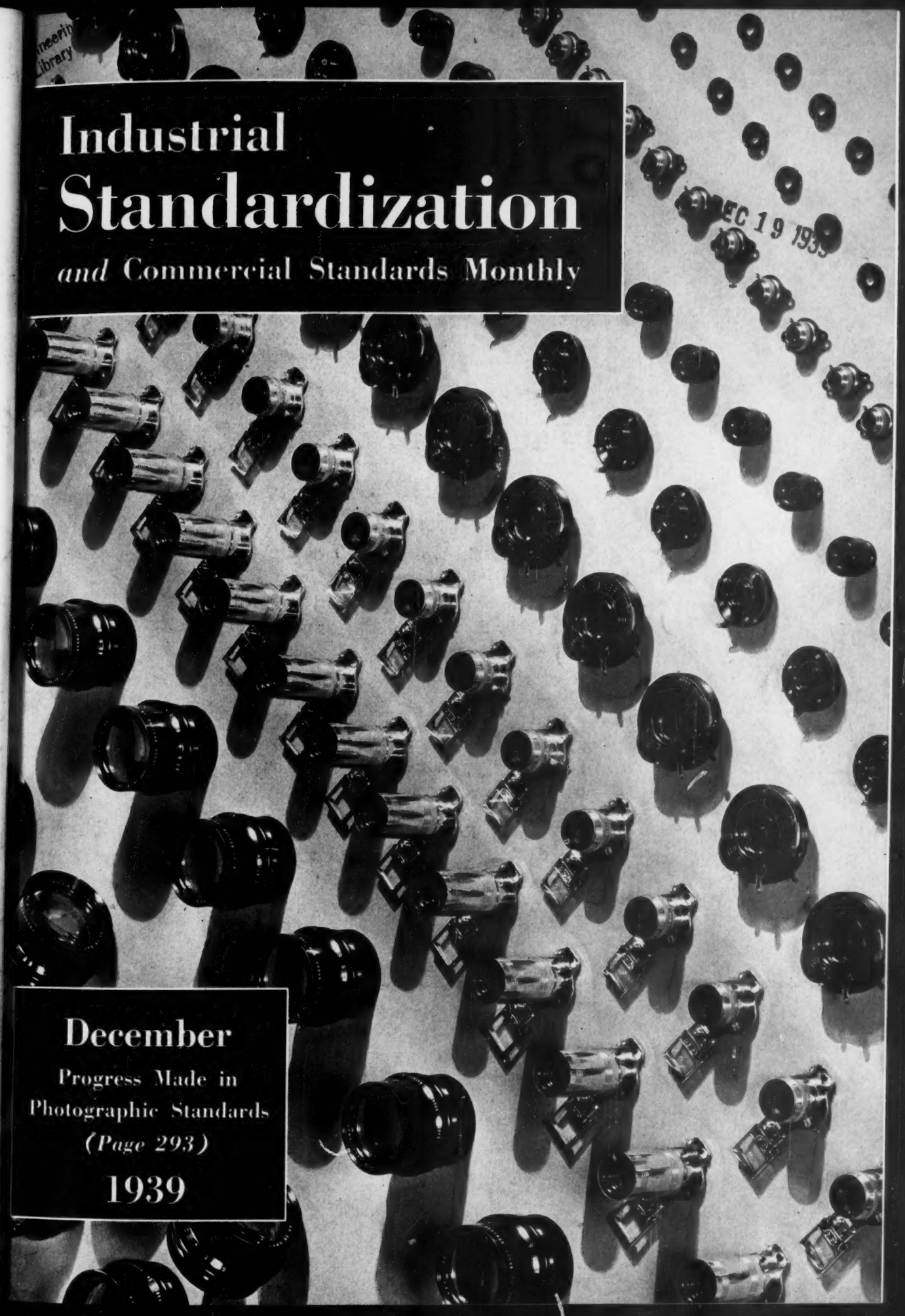
Industrial Standardization

and Commercial Standards Monthly



December

Progress Made in Photographic Standards

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1939

A "Landing in a Flight of Stairs"

A STANDARD is "a landing in a flight of stairs, providing a safe place for resting while advances go up the stairs, to be followed in turn by the standard when another landing is reached."

"One of the important distinctive marks of a standard specification is that it is not the work of a single person but the result of enlightened cooperation. Standard specifications are an embodiment of cooperation."

From the "ASTM Bulletin"

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RUTH E. MASON, *Editor*

This Issue

Our Front Cover: **Photo courtesy Eastman Kodak Company**

ASA

Reg. in U. S. Pat. Off.

Standardization is dynamic, not static. It means not to stand still, but to move forward together.

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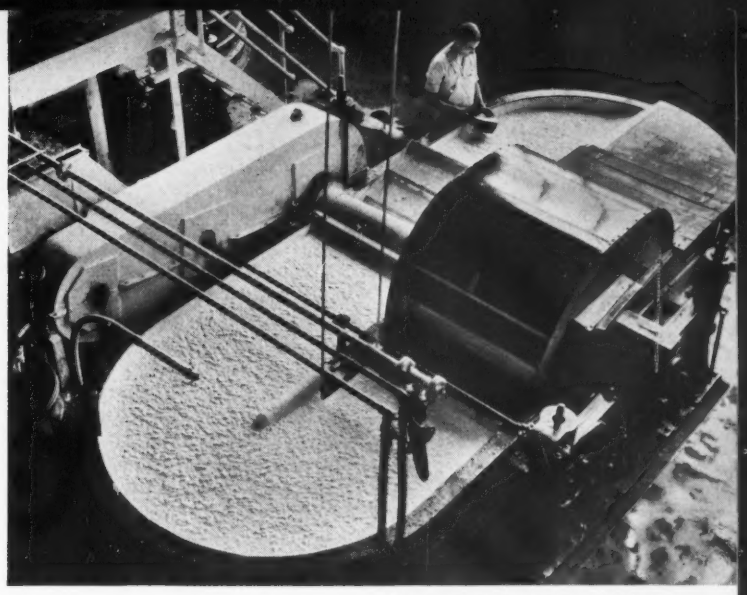
December, 1939 **Vol. 10, No. 12**

DECEMBER, 1939

by

J. W. McNair[1]

Secretary, ASA Committee on Standardization in the Field of Photography



Photos courtesy Eastman Kodak Co.

Purified cellulose fibers, shown here going through a "beater", form the base for photographic papers

Progress Made in Photographic Standardization

Seven subcommittees have been organized, two more are recommended, to develop broad program for national and international standards for photographic equipment

Progress in developing draft standards is already reported

THE work on national as well as international standards for photography, undertaken by a representative committee[2] of the American Standards Association, already shows progress, with several standards now being considered by technical subcommittees.

Four main objectives are before the committee: to develop a system of nomenclature and terminology which will eliminate the present confusion caused by the use of the same words and phrases with different meanings; to agree on dimensional standards to bring about better interchangeability; to agree on uniform methods of expressing characteristics of sensitive materials; and to define tests and methods of measurement which at present are well known or not uniformly used.

The work outlined to meet these objectives covers every phase of photography, but not cinematography,[3] from physical characteristics and dimensions of exposing equipment, sensitive materials and holders, to methods of determining and indicating speed of sensitive materials, focal length of lenses, and lens openings. To be developed effectively, this broad program has been

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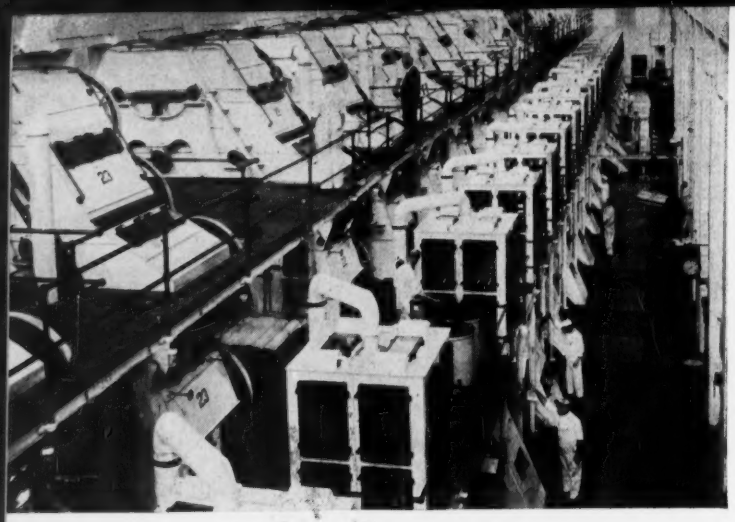
[1]Electrical Engineer, American Standards Association.

[2]Dr. L. A. Jones, Eastman Kodak Co., is chairman; the Optical Society of America is sponsor.

[3]The standardization work on cinematography is taken care of by the ASA Committee on Standards for Motion Pictures. This committee has developed two American Standards, Dimensional Standards for Motion Picture Apparatus (Z22-1930) which is now out of print and is under revision, and Dimensional Standards for 16-mm Motion Picture Film and Equipment (Z22.1-1935), also under revision. This last standard was the basis for an international agreement which accepted its provisions as international practice for 16-mm sound film.



Here fluid "dope" (made from cotton treated with a mixture of nitric and sulphuric acids and then dissolved in a mixture of solvents) is converted into sheets of transparent film base. It is nearly invisible as it passes over the polished rollers.

subdivided into smaller units and seven subcommittees have been organized to carry on the work. These subcommittees cover:

Physical dimensions of unprocessed sensitive materials and holders therefor (Subcommittee 1)—A. D. Jackling, Defender Photo Supply Company, *chairman*

Sensitivity to radiant energy (Subcommittee 2)—M. E. Russell, Eastman Kodak Company, *chairman*

Supports for sensitive coatings (Subcommittee 3)—R. F. Nicholson, U. S. Army Signal Corps, *chairman*

Exposing equipment (Subcommittee 4)—G. C. Whitaker, Fomer-Graflex Company, *chairman*

Photographic characteristics of illuminants (Subcommittee 5)—S. McK. Gray, Electrical Testing Laboratories, *chairman*

Processing equipment (Subcommittee 6)—A. F. Hogle, Master Photo Finishers of America, *chairman*

Printing and projection equipment (Subcommittee 7)—O. W. Richards, Spencer Lens Company, *chairman*

In addition, two new subcommittees are being organized, one to correlate the definitions, symbols, and nomenclature which all the subcommittees will use and the other to consider the possibility of encouraging the use of more uniform practices in the processing of exposed sensitive materials. At present the processing to which exposed photographic materials are subjected by various indviduals and organizations varies enormously and it seems reasonable to assume that considerable confusion and waste can be eliminated if a more uniform practice in handling these materials can be established. With this in mind, this subcommittee hopes to formulate recommended practices which if adopted will result in a general rise in the quality of photographic reproductions. Furthermore, this subcommittee plans to establish certain performance tests by which the quality of a processing operation may be evaluated.

The scope of its work is evident in the program which Subcommittee 1 has outlined for itself. It has already named subcommittees to study the need for dimensional standards covering:

1. **sheet films, photographic plates, and 70-mm perforated roll film for recording instruments**
2. **film, spools, and trailers for aerial photography**
3. **amateur roll film spools, paper and film, and for miniature camera magazines and film**
4. **film and paper used in graphical recording instruments**
5. **sheet paper, bulk roll paper, cores or spools for roll paper, and recommended practice for sizes to be listed as standard sizes**
6. **sheet film holders, sheaths and magazines, pack film adapters, and roll film adapters**
7. **pack film cases, film, and paper tabs**

This committee has already recommended a standard for dimensions of 70-mm perforated film, such as that used in various types of recording scientific instruments, for consideration by the full ASA committee as an international standard as well as an American Standard. Standard dimensions for No. 120 or B-2 Film Spools and for film and paper dimensions in this same size are being completed, the subcommittee reports, and proposals for four widths and 11 lengths of aero film spools as well as a schedule of dimensional standards for pack film, tabs, and cases, are being considered.

Speed Measuring Difficult

One of the most difficult problems which will come before the full committee, but one on which progress has already been reported, has to do with measuring photographic speed of negative materials and sensitivity to light.

The subcommittee has made a tentative draft for an American Standard System of Measuring Photographic Speed of Negative Materials. This includes the definition of the quality of exposing radiation, exposure time, concept of speed, speed criterion, speed numbers, and speed number intervals. This tentative draft has been placed before the sectional committee for its consideration and the subcommittee has requested all members of the sectional committee to give the proposal their most careful consideration and criticism. In general, the committee's reaction to this suggestion has been quite favorable, and the sub-

Two types of glass are cemented together to correct certain optical aberrations in photographic lenses

committee has been informed that the draft appears to offer a satisfactory basis on which to proceed for the formulation of an American Standard. With this beginning the subcommittee is now concerned with working out the details of a standard for presentation at the next meeting. Although little has as yet been done on recommendations for sensitometric processing which also must be included in the proposed standard the members of the subcommittee are convinced that specifications can be drawn for developer formulas, temperature, agitation, etc., which will make it possible to obtain highly reproducible photographic results.

The proposal defines the concept of speed as follows:

Photographic speed is to be considered as related to the minimum exposure which a negative material must receive in order that an excellent print may be made therefrom.

On the basis of this definition the subcommittee proposes that speed should be determined by a gradient method. With this method a point is located on the characteristic curve at which the gradient has some fixed fractional value of the average gradient for specified log exposure range.

Assembling automatic shutters, a job which requires delicate handling of many very small parts

It may be necessary, according to opinion in the subcommittee at present, to specify that the average gradient of a negative must exceed a certain value in order not to encourage production of photographic materials with very low average gradients requiring unduly high contrast papers for making good prints.

This gradient method was discussed at an international conference in Munich last June attended by British, American, German, French, and Swiss representatives. It was agreed at the conference that all groups interested should make extensive tests over a period of one year using the proposed fractional gradient criterion recommended by the American representatives with a processing technic resulting in "normal" development as proposed by the British representatives. If at the end of the year of trial the gradient system is found to be satisfactory, it will probably be considered in the various countries represented for adoption as the reference method for determining the effective camera speeds of photographic materials used by amateurs. The subcommittee has given careful consideration to other possibilities of expressing the effective camera speeds of negative materials, such, for instance, as the use of the inertia criterion and the use of a fixed density criterion, together with the use of a "normal" processing technic or a processing technic resulting in the maximum possible speed value. The general consensus of opinion seems to be that a gradient criterion coupled with a "normal" processing technic offers the greatest

hope of obtaining a speed number of maximum significance and utility.

In close relation to speed is the problem of markings for lens openings, distance scales, and focal length of lenses. The subcommittee on Exposing Equipment now has before it a draft proposal for marking focal length of lenses in millimeters where focal length is less than 500 mm; and in centimeters where the focal length is 500 mm or greater. A series of lens diaphragm stop openings and a series of distance markings are also being considered.

Processing equipment, including tanks, trays, dryers, film and plate racks, and washers, is covered in the work started by Subcommittee 6. Subcommittee 3 is working on supports for sensitive coatings, and Subcommittee 5 on photographic characteristics of illuminants. Subcommittee 7, on printing and projection equipment, has already made some progress in its study of standard sizes for the usable area of lantern slides.

In addition, a survey is being made to determine present practice in the use of terms and symbols in photography as a basis for the work of the proposed new committee on definitions and symbols.

While national standards are perhaps the most immediate aim of the committee's activities, it also has the responsiblity for formulating standards which may be proposed for international adoption.

In 1936, the International Standards Association (a federation of standardizing organizations in 22 countries) asked the American Standards Association to take the secretariat for an international project to develop standards for photography. The American Standards Association, as is its policy, called in American industry for advice. At a conference attended by the important organizations concerned with the manufacture and use of photographic equipment, it was decided that for the best interests of American industry the American Standards Association should undertake this international work. It recommended that the ASA organize a committee to develop American Standards and also to formulate United States opinion on questions of international photographic standards.

As in other ASA work, every group with an essential interest in the project has been invited to appoint representatives on the committee, which is sponsored by the Optical Society of America. Dr. L. A. Jones of the Eastman Kodak Company, one of the representatives of the Optical Society of America, was elected chairman.

Because the work of the ASA Committee on Photography is international as well as national in scope, the national committees on photography in other countries are being kept informed of its progress. In all cases where definite recommendations are made by the subcommittees, the ASA, as secretariat for the international project, circulates these recommendations to the other national committees for their consideration.

The committee has before it a long and difficult task, but when it does succeed in arriving at agreement upon standards, it should mean that every camera user will benefit through better and clearer information concerning the performance of his camera, of developing materials and papers, lights, and lenses. Manufacturers and distributors, as well as users, will have a better understanding of the problems they are facing both nationally and internationally.

CESA Will Propose Canadian Substitutes for British Standards For War Materials

"The CESA [Canadian Engineering Standards Association] has been geared into the industrial side of war operations in its establishment as the special medium for the submitting of proposals, on behalf of Canadian industry, through the British Standards Institution to the three branches of the British War Services (Army, Navy, and Air Force) for the substitution of Canadian products manufactured according to Canadian practices, in place of those specified in British standards which may be difficult to supply under existing conditions. The arrangement was one of the accomplishments of the recent mission of the Canadian Manufacturers' Association to Great Britain."—*CESA Bulletin, September 30, 1939.*

Canadian Standards Association Authorizes Electrical Testing

Approved laboratories will be authorized by the Canadian Engineering Standards Association to carry out tests on which to base approval of electrical equipment as complying with the Canadian Electrical Code, it was decided at the September 29 meeting of the CESA Executive Committee. New members will be added to the CESA staff to take care of the clerical and accounting work needed in connection with the tests.

It is expected that final recommendations for carrying out the new program will be presented at the next meeting of the Executive Committee.

An Administrative Board, made up of W. P. Dobson representing the Hydro-Electric Power Commission of Ontario; B. G. Ballard representing the National Research Council; and the secretary of the CESA, will be in charge.

Advertisers' Poll Shows Strong Interest In Consumer Movement Throughout Country

ADVERTISERS have discovered a strong interest throughout the country in the consumer movement through a survey recently carried out and reported at the October convention of the Association of National Advertisers at Hot Springs, Virginia. The survey, the first of its kind on the consumer movement, was carried out with the same methods which in the past have resulted in accurate predictions of national opinion on many subjects, and shows a surprising degree of interest in and also knowledge of the consumer movement, it was reported.

The survey was in two parts. One covered the general public, weighted slightly in the direction of the more literate and higher income groups. Otherwise, it covered a careful distribution of states, small towns, and cities, as well as of ages, income groups, farms, etc. The other survey was a special study in which high school teachers only were interviewed.

Fifty-three per cent of all those questioned were interested in standardization of products, and 56 per cent of those who expressed interest favored ABC grade labeling, which in order to be effective must be based on standards. Forty-nine per cent, a majority of those who knew about grade labeling, believed that grade labeling should be made compulsory by the government.

Twenty-four per cent of all those interviewed had heard of the consumer movement, and had read one or more of the consumer books, while about 12 per cent had a reasonably intelligent idea of the movement, the report showed. Experts estimate from the data that there are 10,000,000 to 12,000,000 of the more literate population of the country who have an intelligent view of the consumer movement.

Twenty-one per cent of all interviewed had read one or more consumer bulletins or reports, while 11 per cent had attended consumer movement lectures. Three per cent are members of some consumer cooperative. More than half of those who had read consumer movement books reported that they had been influenced to the extent of changing their buying habits, particularly in connection with toothpaste, cosmetics, breakfast foods, and laxatives.

Fifty-nine per cent of those who had an opinion on the subject wanted more governmental regulation of advertising, with those in the high income brackets among the leaders, although 50 per cent believed that most advertising was truthful.

The percentage of those who were familiar with the consumer movement was much larger among the school teachers than among the general public. Eighty-three per cent had read one or more of the consumer books, and nearly two-thirds of this number had been influenced to the extent of changing their buying habits. Eighty-four per cent of the teachers had read one or more consumer bulletins or reports, and 41 per cent of that number were actually subscribers to a consumer bulletin service.

Eighty-seven per cent of the teachers wanted more governmental regulation of advertising, although most said that advertising was more truthful today than it was five years ago.

A question as to whether the Federal Government should set up a department for the consumer brought a negative response from the general public, only 45 per cent of whom were in favor, but an affirmative response from the teachers, 61 per cent being in favor of such action.

Although there was considerable criticism among those questioned to the effect that advertising does not give all the information necessary, 73 per cent of all those questioned said they would prefer to pay more for a nationally advertised product than for an unbranded product.

Recommendations on Paints, Varnishes Revised

A revision of the Simplified Practice Recommendation R144-37, Paints, Varnishes, and Related Products (Shades and Containers), has been approved by the paint and varnish industry at the request of the Standing Committee in charge, according to an announcement by the Division of Simplified Practice, National Bureau of Standards. This has been published as a mimeographed insert and may be obtained from the Division of Simplified Practice.

Through this revision the recommendation now includes half-gallon cans of wagon and carriage paints or enamels. According to members of the industry, the inclusion of half-gallon cans offers a more convenient size for the amateur and farmer who do their own painting. The change became effective November 1, 1939.

New Project for Better Construction, Lower Cost Should Encourage More Building

by

Myron W. Adams[1]

Secretary, ASA Committee on Coordination of Dimensions of Building Materials and Equipment

LAST November, a cooperative enterprise in the building field was launched under the procedure of the American Standards Association. The purpose of this work is to coordinate the dimensions of building materials and equipment in the interests of efficiency and economy. Enough standardization has already been done in the building field to indicate the possibilities of a very much enlarged standardization project which will apply also to building parts and building materials, and even to methods of assembly.

Bemis Industries, now the Modular Service Association, originally proposed that the American Standards Association undertake this work. The American Standards Association then, in accordance with its usual custom, called an open meeting of the building industries at which architects, builders, government bureaus interested in standardization or housing problems, prefabricators, and other groups representing manufacturers or users of building materials, had an opportunity to discuss the project. When this meeting endorsed the idea, the American Standards Association definitely authorized a standardization project to coordinate the dimensions of building materials and equipment, sponsored jointly by the American Institute of Architects and the Producers' Council, Inc.

The committee, organized to take charge of the job, includes representatives of more than 40 different trade associations, engineering societies, and other organizations connected with the building industry.

Its first meeting was held in New York on July 13 of this year.

Since that time four special research committees have been organized to start on the detailed work. One of these is dealing with masonry materials made of structural clay products. A second is working on wood doors and windows. A third committee is at work on masonry made of concrete and cast stone, and a fourth on metal windows. Two more committees are in prospect: one to cover natural stones including marble, granite, and limestone; and one for structural wood. Additional research work will, of course, be necessary; and more committees will be set up as the whole project develops.

In connection with the research work, arrangements have been made to cooperate with the architects for one of the Washington Alley Projects. Thus, it will be possible to test the details as

Mr. Adams tells why this new work on coordination of dimensions of building materials and equipment, recently undertaken by the American Standards Association, should help the building industry

[1]Secretary, Modular Service Association, Boston, Mass.

they are developed by applying them to actual building problems.

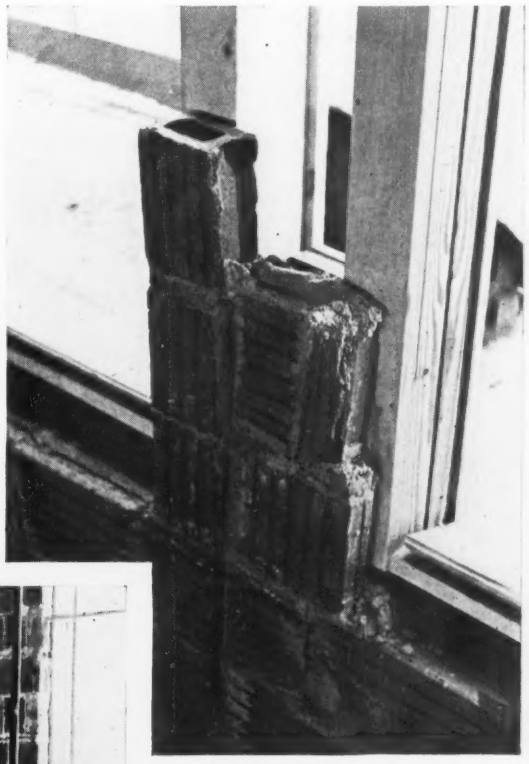
The Plan of the Work

Our objective is to make building parts available to the industry in standard sizes and dimensions that are coordinated. By "building parts" we mean the building materials, accessories, and equipment items in the form that they are delivered to the building site for erection. They include the building structure, a variety of collateral materials, and all accessory and equipment items that are permanently fitted to the building.

The coordination of the sizes and dimensions of these parts is our immediate problem and specific task. What is coordination? It is a relationship between the sizes and dimensions of the parts that will assure their proper interfitting within the building structure. Our plan is that these coordinated sizes will be predetermined and listed as standards suitable for coordination. They will be established in varieties sufficient to meet the general requirements of utility and design.

Since coordination is a question of the interfitting of parts in the structure, this work is first concerned with the development of sound assembly details. A uniformity of assembly details is an essential requirement for any workable coordination of sizes. For example, consider the installation of a wood window in a tile wall. The committee plans to develop suitable assembly details for jamb, head, and sill-details that will apply to any standard size of that type of window. The necessity for this uniformity of assembly details is fully recognized by the industry today and is used in present practice. In the example cited, such uniformity is generally maintained, but it is accomplished only by the field cutting of some of the parts as shown in the pictures below. Usually the tile has to be cut to create a wall opening that is coordinated with the size of the window frame. The industry does develop uniform details but is not able to create them out of the present standard sizes of parts because present standards are not coordinated.

The essential basis for a practical coordination follows from this necessity of maintaining a uniformity of assembly details. Suppose that we have erected a wall of a building using only parts of the standard sizes recommended for coordination, and that the wall includes a window of one standard width. An architect wishes to build a



Photos courtesy Modular Service Assn.

Field cutting of masonry units to coordinate wall opening with size of window frame (above) wastes labor, materials

Pile of rubbish (left) was good masonry materials. Note variations in course heights, all done by hand cutting

similar wall, using a wider window of the next standard width. He will have to select standard sizes for other parts that will fit with the new window. If the window is 4 inches wider, certain parts, such as sill, lintel, and finish panel under the window, will have to be exactly 4 inches longer to maintain the original assembly details. If the wall length and space on one side of the window are unchanged, the wall space on the other side will be reduced by 4 inches and will require a reduction of exactly 4 inches in some of the parts in it, and also in items fitted to it: for example, a bathtub or a kitchen cabinet. Thus, we find that the uniformity of assembly details can be maintained only if the size changes are all numerically equal, even though some are increases and some are decreases.

For want of a better term we have called this variation in the size of similar parts a "size increment." To carry out this coordination program this uniform size increment must apply to all building parts. It must also apply to the dimensions of the building which are determined by the sizes of the parts. In other words, coordination includes the dimensions and layout of the building and the size increment becomes also a layout unit. It should be emphasized, however, that the sizes of the individual parts are not necessarily or usually exact multiples of this unit.

Our task of developing a basis for coordination thus amounts to finding a practical method of applying a uniform size increment to all building dimensions and to the sizes of its component parts. Our committee is at present testing a simple drawing-board method of obtaining this coordination.

What Benefits We Expect from the Work

This work has possibilities which cannot even be estimated as yet. I shall make no attempt to speculate upon them, but rather confine myself to some of the obvious and immediate benefits of the project.

The first and most apparent economy that coordination offers is a reduction in field erection costs. This includes both labor and materials, with consequent economy in freight and handling. For certain building materials and types of construction, these economies are very substantial. For one type of masonry it has been estimated that 75 per cent of the total field erection cost may be charged to the field cutting of the masonry units. Most of this could be eliminated by the work now underway. Even in the case of such an easily cut material as wood, the builder may find it more economical to transfer the cutting operations from the field to the shop. Furthermore, if a building boom does develop in this country, a serious shortage of skilled field labor will undoubtedly result. This condition would make a transfer of erection problems from the field to the factory or mill increasingly important and urgent.

For certain types of building materials these field problems have already been transferred to drafting room and factory. For example, such materials as steel must of necessity be delivered to the site in sizes and shapes that will fit together. At the present time most of these parts are manufactured on a strictly custom basis. However, the development of coordinated standard sizes and standard assembly details would make it possible to manufacture and stock many of these parts on a quantity basis, the economy of which is obvious.

Duplication Increases Costs

Many of the producing industries are now faced with problems of simplifying their present standards. There exists much duplication and overlapping of sizes which unnecessarily increase the costs of the manufacturer and jobber. Some of these industries believe that this project will afford them a logical and authoritative basis for accomplishing a simplification of sizes that is urgently needed.

Certain producers have called attention to other manufacturing economies and advantages that would result from standardization of their product. One industry points out that standardization will make possible the use of raw material for which at present no market can be found. Another manufacturer has stated that production on a quantity basis will result in important improvements in the quality of his finished product. For instance, the increased precision in manufacture resulting from the use of mass production methods, will make his product easier to install and will eliminate certain difficulties which now arise in its use.

Other producers feel that standardization will help the development of new building materials or of new uses for such existing materials as cannot easily be cut on the job.

It is interesting to note that one manufacturer, probably the only one already using completely standardized assembly details, reports another important advantage of standardization. In the housing industry, carpenter builders are often prone to skimp and cut corners to save an immediate penny, and the faults which develop from this practice are charged wrongly to the building material. Many a material of merit has consequently suffered serious discredit because of faulty application. This manufacturer reports that standardization has made it easier and cheap-

er for the carpenter builders to follow the standard details furnished them than to skimp and cut corners as formerly. To many manufacturers this method of control of the product in the hands of the users would prove invaluable.

Another producer of building materials emphasizes the advantage that his industry will derive through the improved availability of its product to the architect. Standardization will make it possible for the architect to know exactly what he can buy out of stock. It will further give him such precise and complete information about the product that he will no longer have to work out his own details.

So far I have said little about the position of the architect in this work. It is obvious that whatever we do in the way of standardization must be backed by architect and building designer, for coordination will be used by the industry only insofar as the individual architect adopts it. We definitely expect to help the architect, and to make it profitable for him to play a greater part in the building of small homes. One of the prime reasons for undertaking this coordination work at all is to simplify the work of laying out buildings and of specifying sizes and parts that will fit together properly.

Just within the last week another advantage of coordination has been brought forcibly to my attention. In planning large housing projects the backers frequently wish to get accurate estimates on alternate building materials and construction systems. This usually requires a complete new layout and detailing of the project for each material, making alternate estimates very costly. With the development of coordinated sizes, however, one nominal layout will apply without change to all building materials in any combination. Furthermore, the assembly details for each combination of materials, when once complete, can serve as standard for the entire project and do not have to be redrawn. It then becomes a simple matter to get accurate costs on the use of various alternate materials.

It should further be noted that the entire process of taking off quantities of materials is much simplified by this coordination of dimensions, with a consequent saving in labor, and a reduced likelihood of error.

Manufacturers Benefit

Even the manufacturer who feels that none of the particular advantages mentioned applies to his case is bound to benefit from any broad advance in the building art. Lower cost buildings mean more buildings, and everyone will reap a share of the benefit.

The question is frequently raised as to why the work which we are now undertaking has not been started before. Why have the building trades been so slow to adopt the improved methods and lower costs of mass production that have generally obtained throughout industry? The reason for this, of course, has been the difficulty of cooperation in such a varied field as building. For example, to develop sound jamb, head, and sill assembly details for wood windows in masonry walls calls for a combination of the best skill and technical knowledge of the wood window manufacturers, of the masonry producers, and also of the construction industry.

Notable progress has already been made in the standardization of accessories and in the mass production of heating, lighting, plumbing, kitchen, and bathroom fixtures. Here, however, each manufacturing group has established its own standard sizes, and correlation by all the industries involved, although it would frequently lead to further economies, has not been possible.

Before this work of coordination of building materials and equipment could be started, the machinery had to be set up for systematic cooperation between all the interested groups. This has now been done through the American Standards Association, an organization that has had broad experience in helping to solve similar complicated technical problems.

The present committee which is working on the coordination of dimensions of building materials and equipment brings together the experience and skill of many branches of the building industry. The size of the task ahead of this committee is considerable, but there is no reason to be appalled by it. Definite and important economies are within our reach. Certain applications of this work which are clearly recognized by the industry may be completed within a relatively short time. Once these have been proved the further development and progress of this work will be assured.

Courtesy Homasote Co.

Coordination of dimensions makes possible precutting and assembly in the shop

Agricultural Marketing Service Does Government's Agricultural Standards Work

TWO corrections have been called to our attention in the chart of the Government of the United States, published in our November issue. Both have to do with agencies of the Department of Agriculture.

The Agricultural Marketing Service, one of the new bureaus, is now carrying on all of the standardization work formerly done under the auspices of the Bureau of Agricultural Economics. It should be credited on the chart with a cross and a star. Head of the Service is C. W. Kitchen, alternate representative of the Department of Agriculture on the ASA Standards Council.

There are now standards for grain, cotton, tobacco, 56 of the fruits and vegetables, and most of the other farm products, under the jurisdiction of the new Service. Some are mandatory when the products covered are sold by grade and are shipped in interstate or foreign commerce. These are not minimum standards, such as those established under the Food and Drug Act, but cover the entire range of quality bought and sold on the market. They are implemented through the grading and inspection program of the Marketing Service. A permissive grading service is also conducted on dairy and poultry products, cotton, rice, meats, wool, and canned fruits and vegetables. Programs for carrying the grade designations through to the consumer have been developed for meats, poultry, eggs, and butter.

Speaking of its grading and inspection service, the Agricultural Marketing Service explains:

"They [standards] must differentiate the full range of commercial quality in a supply to afford a basis for trading in all qualities of the product. In evaluating a product to the grower, to the processor or manufacturer, and to the consumer, the standards must be uniform, on a nation-wide scale. They cannot vary from region to region, nor from market to market. Neither can they be changed from season to season to conform to the quality of the crop. They are uniform in reality, however, only to the extent that they are interpreted accurately and applied consistently. This necessitates centralized training and supervision of the inspectors who apply the standards."

Correction to Last Month's Chart of Government of United States

The second correction has to do with Banks for Cooperatives, shown on the chart as of equal rank with the Farm Credit Administration, whereas actually it is a subordinate agency. Banks for Cooperatives should, therefore, be indented in the same column with Production Credit Corporations and the Cooperative Research and Service Division, under the Farm Credit Administration.

Both these corrections have been made on the reprints of the chart, which are available from the ASA at 20 cents each.

Federal Specifications Recently Approved

The following Federal Specifications and Amendments have been approved by the Director of Procurement for Government purchasing and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each. The date on which the specification will become effective is indicated following its title in the list below.

Calendar-Pads and Stands GG-C-101a (superseding GG-C-101) Jan. 1, 1940
Cements, Hydraulic; General Specifications (Methods for Sampling, Inspection, and Testing) Amendment-1 SS-C-158 Dec. 31, 1939
Cheese; American (Cheddar or American-Cheddar) and Process American Amendment-1 C-C-271a Dec. 31, 1939
Fans, Electric; Bracket and Desk-Types, Rigid-Blades, (for Shore Use) W-F-101a (superseding FS. No. 491—/W-F-101) Jan. 1, 1940
Ice Cream; Sherbets and Ices EE-I-116a (superseding EE-I-116) Jan. 1, 1940
Lime; Hydraulic, Hydrated Amendment-1 SS-L-361 Dec. 31, 1939
Milk, Dry, Powdered; Skimmed and Whole C-M-351b (superseding C-M-351a) Dec. 31, 1939
Mowers, Lawn; Hand OO-M-671a (superseding OO-M-671) Jan. 1, 1940
Pads, Desk UU-P-16 Jan. 15, 1940
Platters, Meat; Corrosion-Resisting-Steel RR-P-416 Dec. 31, 1939
Prunes, Dried; Canned Amendment-1 Z-P-671b Dec. 31, 1939
Punches; Paper, One-Hole (with and without Eyelet Device) GGG-P-846 Jan. 1, 1940
Sirup Amendment-2 JJJ-S-351a Dec. 31, 1939
Steels, Corrosion-Resisting; Bars and Forgings QQ-S-763 Feb. 1, 1940
Tableware; Corrosion-Resisting-Steel Amendment-1 RR-T-41a Dec. 31, 1939
Varnish; Spar, Water-Resisting Amendment-1 TT-V-121a Jan. 15, 1940

Fourth Standard Completes Classification of Coals[1]

by

A. C. Fieldner[2]

Chairman, ASA Committee on Classification of Coals

THE recent adoption of standard definitions for varieties of coal by the American Society for Testing Materials and their approval as American Standards by the American Standards Association complete the assignment of the Sectional Committee on Classification of Coals. This committee, sponsored by the American Society for Testing Materials, was organized in 1927 under the rules of the American Standards Association. Its membership was distributed equally among producers, consumers, and persons having general interest in the subject. The last group included some of the leading geologists, chemists, and fuel engineers of the United States and Canada. The presence of four proponents of coal-classification systems of their own did not simplify the task of the committee, but did insure thorough discussion of the various systems proposed for American coals.

The scope of the committee's activity covered "The classification of all coals from anthracite to lignite, to be based on such chemical and physical characteristics as will make the plan most readily adaptable to industrial and commercial use on a national scale."

The first step was to undertake a comprehensive program of fact-finding and research in order that the classification should have a sound scientific, as well as a practical, basis. An Associate Committee on Coal Classification and Analysis of the National Research Council of Canada also was formed and gave most valuable cooperation in the work.

The problem was complex owing to the fact that coal is a natural product derived from a variety of original ingredients that subsequently have been subjected to different conditions—biochemical and environmental changes in the early stages of formation, the nature and thickness of overlying strata, heat and pressure effects resulting from rock movements and igneous intrusions, infiltering minerals, and weathering in some instances.

Coals of all ranks from lignite to anthracite are commercially produced in the United States from some 6,000 mines, situated in more than 30 states. The average annual production—about 500 million tons—greatly exceeds the tonnage shipments of any other commodity or any natural group of commodities. The combined coal reserves of the United States and Canada form two-thirds of the world's known coal supply.

The need for systematic classification of such a widely used natural product as coal has been obvious, and many systems of classification have been proposed by individuals during the past 100 years. Certain of these systems have become widely known and have served a useful purpose in providing broad, general designations for various ranks of coal. However, they have not received widespread official adoption, and on the whole are not sufficiently detailed to meet modern needs.

Classification of coals, from anthracite to lignite, based on chemical and physical characteristics for industrial and commercial use on a national scale, is the purpose of the work now completed by a widely representative committee, brought together by the American Standards Association, sponsored by the American Society for Testing Materials.

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[1]Published by permission of the Director, Bureau of Mines, U. S. Department of the Interior.

[2]Chief, Technologic Branch, U. S. Bureau of Mines, Washington, D. C.

The committee critically examined previously proposed systems of classification and carefully studied their application to the wide variety of North American coals. Voluminous data on the chemical and physical properties of coals were collected, and much research was sponsored in this connection and in the development of standard methods for assessing certain properties of coal, such as weathering and agglomeration, that seemed important in its classification.

From these studies the committee concluded that coals could be classified usefully, according to their inherent composition and properties, along three different lines, as follows:

1. By rank, that is, according to the degree of metamorphism, or progressive alteration in the natural series from lignite to anthracite;
2. By grade, that is, according to the nature and amount of impurities present, screen size, analysis, heating value, etc;
3. By type, that is, by varieties such as common banded, splint, cannel, and boghead or algal coals.

Technical committees were appointed to work out systems of classification along these three lines.

Classification by Rank

Classification by rank appeared to be the most important because this type of classification has been used for many years by geologists, chemists, and engineers in describing and referring to different kinds of coal.

From an early date most American scientists have classified the rank of a coal largely by the percentage of volatile matter or fixed carbon shown in the proximate analysis, the highest-rank coals (such as anthracite) having the lowest volatile-matter content and the highest fixed carbon. However, differentiation on this basis failed when applied to low-rank bituminous coal, subbituminous coal, and lignite. Among the latter the volatile matter and fixed carbon do not vary significantly.

Extended studies showed that in general these ranks of coals are characterized by an increasing moisture content and decreasing heating value as the rank decreases from bituminous coal to subbituminous coal and to lignite. In other words, it appeared feasible to develop a system of classification in which anthracite and the high-rank bituminous coals could be classified on the basis of their fixed-carbon content, calculated to the dry, mineral-matter-free basis, and the low-rank coals and lignites on the basis of their Btu value on the moist, mineral-matter-free basis. Moist basis means that the natural bed moisture is considered part of the coal, but visible surface moisture is not to be included. To avoid the disturbing effect of ash-forming impurities in the coal, the percentage of fixed carbon and the Btu are calculated to a mineral-matter-free basis.

Classification on the basis of dry, mineral-matter-free fixed carbon and moist, mineral-matter-free Btu was then applied by the committee to many thousands of analyses of coals and lignites from virtually every coal region of the United States and Canada. Boundary lines were established, as a result of this study, between the various groups of coals. Some further criteria were found necessary to distinguish between certain groups, for example, the agglomerating value and the weathering index.

This system of classification based upon fixed carbon and Btu appeared to be most suitable of those studied by the committee because it follows lines that have been used in America for many years and therefore introduces no serious confusion in our coal literature; moreover, definite boundaries are set up between classes and groups, and can be determined by simple tests available for most coals in the usual proximate analysis and Btu determination. A resume of the specifications for the classification of coals by rank is given in Table I.

The committee recommended these specifications for the classification of coals by rank as tentative in 1934, and in 1937 the American Society for Testing Materials and the American Standards Association adopted them as American Standard.

Classification of Coals by Grade

The classification of coal according to grade depends primarily on the amount and nature of the impurities present, such as ash-forming constituents, sulfur, fusibility of the ash, etc. The grade of a coal also is conditioned largely by the composition and physical properties but often can be modified by methods of cleaning and preparation. The grade of a coal is expressed by the size designation, percentage of ash and sulfur, fusibility of the ash, and heating value of the coal as delivered. Tentative specifications for grade classification were issued by the committee in 1934. These included a table of symbols for grading coal according to ash, softening temperature of ash, sulfur, and Btu, all expressed on the basis of the coal as sampled. These symbols represent a logical series of variations that might be tolerated in a given grade of coal with respect to ash, Btu, sulfur, and fusion temperature of the ash. Subsequently a method of designating the size of coal was added to the specifications, and in 1937 the grade specifications were adopted as standard. It is a question whether the symbols for grading coal will find practical use in industry. The use of the actual analytical values of

the proximate analysis may prove preferable to step-wise designation of the table.

Varieties of Coal

A third method of classifying coal is one based primarily upon the origin of the coal, that is, the kind of plant material from which the coal was formed and the manner in which this material was accumulated in the original deposit of plant remains. Geologists usually refer to this kind of classification as the type of coal. Microscopic examination of thin sections of coal or of polished surfaces reveals many of the plant structures, and fairly good deductions can be made of the kind of plants or parts of plants that contributed to the major part of the coal. As a result of such microscopic studies and of the attending geological conditions many different types of coal have been recognized and described by paleobotanists.

The committee attempted to develop a system of standard classification by type based upon origin but found it impossible to reach agreement on the interpretation of the complex data revealed by these paleobotanical studies. Furthermore, it

TABLE 1

Classification of Coals by Rank[a]

(Legend: FC=fixed carbon; VM=volatile matter; Btu=British thermal units)

Class	*Group*	*Limits of fixed carbon or Btu mineral-matter-free basis*	*Requisite physical properties*
I. Anthracitic	1. Meta-anthracite	Dry FC, 98 percent or more (dry VM, 2 percent or less)	
	2. Anthracite	Dry FC, 92 percent or more and less than 98 percent (dry VM, 8 percent or less and more than 2 percent)	
	3. Semianthracite	Dry FC, 86 percent or more and less than 92 percent (dry VM, 14 percent or less and more than 8 percent)	Nonagglomerating[b]
II. Bituminous[d]	1. Low-volatile bituminous coal	Dry FC, 78 percent or more and less than 86 percent (dry VM, 22 percent or less and more than 14 percent)	
	2. Medium-volatile bituminous coal	Dry FC, 69 percent or more and less than 78 percent (dry VM, 31 percent or less and more than 22 percent)	
	3. High-volatile A bituminous coal	Dry FC, less than 69 percent (dry VM, more than 31 percent); and moist[c] Btu, 14,000[e] or more	
	4. High-volatile B bituminous coal	Moist[c] Btu, 13,000 or more and less than 14,000[e]	
	5. High-volatile C bituminous coal	Moist Btu, 11,000 or more and less than 13,000[e]	Either agglomerating or nonweathering[f]
III. Subbituminous	1. Subbituminous A coal	Moist Btu, 11,000 or more and less than 13,000[e]	Both weathering and nonagglomerating
	2. Subbituminous B coal	Moist Btu, 9,500 or more and less than 11,000[e]	
	3. Subbituminous C coal	Moist Btu, 8,300 or more and less than 9,500[e]	
IV. Lignitic	1. Lignite	Moist Btu, less than 8,300	Consolidated
	2. Brown coal	Moist Btu, less than 8,300	Unconsolidated

[a]This classification does not include a few coals which have unusual physical and chemical properties and which come within the limits of fixed carbon or Btu of the high-volatile bituminous and subbituminous ranks. All of these coals either contain less than 48 percent dry, mineral-matter-free fixed carbon or have more than 15,500 moist, mineral-matter-free Btu.

[b]If agglomerating, classify in low-volatile group of the bituminous class.

[c]Moist Btu refers to coal containing its natural bed moisture but not including visible water on the surface of the coal.

[d]It is recognized that there may be non-caking varieties in each group of the bituminous class.

[e]Coals having 69 percent or more fixed carbon on the dry, mineral-matter-free basis shall be classified according to fixed carbon, regardless of Btu.

[f]There are three varieties of coal in the High-volatile C bituminous coal group, namely, Variety 1, agglomerating and non-weathering; Variety 2, agglomerating and weathering; Variety 3, non-agglomerating and non-weathering.

The four standards rounding out the work on classification of coals have been published by the American Society for Testing Materials, which sponsored the committee's work. They are:

Classification of Coals by Rank, American Standard Specifications (ASTM D 388-37) M20.1-1937 25 cents

Classification of Coals by Grade, American Standard Specifications (ASTM D 389-37) M20.2-1937 25 cents

Method of Designating the Size of Coals from Its Screen Analysis (ASTM D 431-38) M20.3-1938 25 cents

Definitions for Varieties of Bituminous and Subbituminous Coals, American Standard (ASTM D 493-39) M20.4-1939 25 cents

Copies are available from the American Standards Association or from the American Society for Testing Materials, 260 S. Broad Street, Philadelphia. ASA Members are entitled to 20 per cent discount on all approved American Standards purchased from the American Standards Association.

concluded that such type classification would be too complex to apply in the commercial use of coal. Steps were taken therefore to develop a simpler classification based primarily upon the appearance of the coal and upon simple tests that come within the scope of the ordinary laboratory. On this basis standard definitions were formulated for the four principal varieties of coal that are now recognized in the trade:

Common Banded Coal.—The common variety of bituminous and subbituminous coal. It consists of a sequence of irregularly alternating layers or lenses of (1) homogeneous black material having a brilliant vitreous luster; (2) grayish-black, less brilliant, striated material, usually of silky luster; and (3) generally thinner bands or lenses of soft, powdery, fibrous particles of mineral charcoal. The difference in luster of the bands is greater in bituminous than in subbituminous coal.

Splint Coal.—A variety of bituminous or subbituminous coal, commonly having a dull luster and grayish-black color, of compact structure, often containing a few thin irregular bands with vitreous luster. When struck, it is resonant. It is hard and tough and breaks with an irregular, rough, sometimes splintery fracture. It is free burning and does not swell on heating.

Cannel Coal.—A variety of bituminous or subbituminous coal of uniform and compact fine-grained texture with a general absence of banded structure. It is dark gray to black, has a greasy luster, and is noticeably of conchoidal or shell-like fracture. It is noncaking, yields a high percentage of volatile matter, ignites easily, and burns with a luminous, smoky flame.

Boghead Coal.—A variety of bituminous or subbituminous coal resembling cannel coal in appearance and behavior during combustion. It is characterized by a high percentage of algal remains and volatile matter. Upon distillation it gives exceptionally high yields of tar and oil.

The above definitions for varieties of coal were adopted as standard in 1939, and they complete the assignment of the ASA Committee on Classification of Coals. The committee will now be discharged, and any future changes or modifications in these standards will be made by Committee D-5 on Coal and Coke of the American Society for Testing Materials.

Importance of Coal Classification

The class and group designation of a coal in the scale of rank is of primary importance in the selection of a fuel for most purposes. Such designation also is used in describing coal and in the collection and publication of statistics on coal.

Grade-classification requirements vary considerably with different uses. They are of ordinary importance for fuel used in burning brick, tile, cement, and lime; and for locomotive, spreader stoker, and domestic fuel. They are of more than ordinary importance for chain-grate and over-feed stokers, for pulverized-coal firing and cargo fuel, and for the manufacture of gas and the burning of whiteware and refractories. They are essential in coal burned with underfeed stokers and in hand-fired furnaces, in metallurgical and bunker coal, and in fuel used for burning terra cotta.

Size is only of ordinary importance for metallurgical, ceramic, and pulverized fuel and for coking coal. For other uses size ranges from more than ordinary importance to very essential.

For most uses, the importance of impurities ranges from ordinary to more than ordinary importance. With high cost of ash removal, slagging of boiler tubes and for certain special purposes, the impurity factor is an essential consideration.

The variety classification is less important commercially than either rank or grade classification. By far the greatest portion of American coals is of the common banded variety. The nonbanded coals, cannel, and boghead are of limited local occurrence and are used principally for domestic fuel, especially open grate fires. The banded coals consist of common bright and splint coals. Common bright coals may be either caking or noncaking. Splint coals usually are poorly caking and free burning.

New Foreign Standards Available To Members From ASA Library

NEW and revised standards recently received by the American Standards Association from national standardizing organizations in other countries include many subjects of interest to American industry. They are published in the language of the country from which they were received.

When ordering a standard, please include its number.

Australia

Ward beds of the adjustable mattress frame type (Com Std 10, Part 9, Section 5)
Specifications and methods of test for Portland cement and high-early-strength Portland cement (A.2-1939)
Electrodes for metallic arc welding (A.18-1939)
Porcelain insulators for overhead power lines and outdoor switching structures (C.67-1939)
Benzole and toluole (K.28 and 29-1939)
Welding code (CA.8-1939)
Street lighting code (CA.19-1939)
Amendment to boiler code (CB.1-1939)

Canada

Galvanized steel wire strand (B12-1939)
Construction and inspection of boilers and pressure vessels (B51-1939)
Mechanical refrigeration code (B52-1939)
Reinforced concrete poles (C14-1939)
Electrical code, part I (C22.1-1939)
Design of CESA cast lead-pin thread for insulator pins of nominal diameters of 1 in. and $1\frac{3}{8}$ in. (C58-1939)

Great Britain

Toolmakers flats and high precision surface plates (869-1939)
Abrasive papers and cloths for general purposes—emery cloth, glass paper, glass cloth, flint paper, flint cloth (871-1939)
Abrasive papers and cloths (Technical products)—roll flint paper, waterproof flint paper, waterproof silicon carbide paper, garnet paper, garnet cloth, aluminum oxide metalworking abrasive cloth (872-1939)
Construction of road traffic signs (cast metal) and posts (873-1939)
Definitions of heat insulating terms and methods of determining thermal conductivity and solar reflectivity (874-1939)
Calorifiers (853-1939)
Foamed blastfurnace slag for concrete aggregate (877-1939)
Hand hammers (876-1939)
Micrometers (870-1939)
Silica basins, crucibles, and capsules (875-1939)

Revised British Standards

Classification of lubricating oils (210-1939) (supersedes BS 210-1924)
Mining-type transformers (355-1939) (supersedes BS 355-1929)
Road traffic control (electric) light signals (505-1939) (supersedes BS 505-1937)
Capillary joints for copper tubes (internal dimensions of sockets) (864-1929)

Revised British Standards (Cont.)

Cod oil for sulphonation purposes (868-1939)
70-mm perforated film for recording purposes (865-1939)
Schedule of sizes of metal containers for food products for British packers in the United Kingdom (866-1939)
Steel straightedges of rectangular section (863-1939)
Table of approximate comparison of hardness scales (860-1939)
Traction lamps (series burning) (867-1939, formerly part of BS 555-1935)
Tungsten filament electric lamps other than general service (555-1939, superseding BS 555-1935)
Sizes of road stone and chippings (63-1939, superseding BS 63-1928)

British Air Raid Precautions Standards

Aggregates for concrete shelters (BS/ARP 1)
Bituminous paint and bituminous compound for the protection of steelwork (BS/ARP 2)
Electric hand-lamps (fitted with primary battery or unspillable accumulator) (BS/ARP 3)
Apparatus for decontamination of oilskin clothing (BS/ARP 4)
Chemical closets for use in shelter accommodations (BS/ARP 5)
Shelter lighting (shelters for 50 persons 210 sq ft) or multiples thereof up to 200 persons (BS/ARP 6)
Rubber gaskets for rendering doors and windows gas tight (BS/ARP 10)
Adhesive tape for fixing gas proof material, repairing damaged material, or sealing apertures and cracks, etc. (BS/ARP)
Petroleum jelly for sealing gas-tight doors, etc. (BS/ARP 12)
Black blind material for obscuring windows (BS/ARP 14)
Light traps for shops (BS/ARP)
Specific methods of providing even illumination of low intensity (.002) (BS/ARP 16)
Specific methods of providing even illumination of low intensity (.02) (BS/ARP 20)

Holland

Curbstones of concrete, dimensions and specifications (N498); methods of testing (N499)
Tools, nomenclature of planing, shaping, and slotting tools (N826); Screwplates for metric and metric fine screw thread (N841); Screwplates for Whitworth and Whitworth pipethreads (N842); Screwplate holders (N843); Twist drills with straight shank from 0.3 mm to 2 mm wheels (N847); Nomenclature of grinding wheels (N851)
Dry pigments, methods of test for minimum of iron (N882); Methods of test for ochre, umber, and terra di Siena (N883); Methods of test for chrome-yellow (N884); Methods of test for Berlin blue (N885); Methods of test for Bremengreen (N886)
Gasmasks, specifications for rubber parts and for elastic tape (N892)
Light railways. Gauge. Indications for the choice of complete superstructure (N1135); Steel cross ties, clips and bolts for rails NP6 and NP8 (N1136); Steel cross ties, clips, and bolts for rails NP 10 and NP 12.5 (N1137); Steel cross ties, clips and bolts for rails NP 15 and NP 17.5 (N1138)

Foreign Draft Standards Available from ASA

Drafts of proposed standards have been received by the American Standards Association as follows:

Australia

Agricultural machinery: knife sections for mowers; sprocket chain (Comments before March 15, 1940)
Electric motor-operated appliances (with ratings not exceeding 1 hp) (Comments before February 29, 1940)
General conditions of contract for civil engineering works, electrical engineering works, and general machinery (Comments before February 29, 1940)
Varnishes—Interior oil varnish; exterior oil varnish; flatting and rubbing oil varnish (Comments before January 31, 1940)

Great Britain

Graphic (recording or chart-recording) ammeters, voltmeters, wattmeters, power-factor meters and frequency meters (Comments before February 17, 1940)
Non-ferrous pipes and piping installations for and in connection with land boilers (Comments before February 1, 1940)
Pressure creosoting of timber (Comments before January 13, 1940)
Valves, gauges and similar fittings for air receivers for and in connection with compressed air installations (Comments before January 30, 1940)

New Zealand

Dry cleaning solvent (Comments before February 29, 1940)
Electrodes for metallic arc welding in mild steel construction (Comments before January 31, 1940)
Road grader cutting edges and tynes (Comments before February 15, 1940)

The American Standards Association will forward any comments on these proposed standards to the national standardization bodies concerned. The final date on which comments will be considered is given in each case. Copies of the drafts may be borrowed from the ASA office.

Steel Standardization Program Described in *Iron Age* Reprint

A steel standardization program which has been in effect for several years has resulted in better products at lower costs, according to a comprehensive article by A. L. Hartley, metallurgist of the R. K. LeBlond Machine Tool Company, Cincinnati. Mr. Hartley's article was published in five installments in the September 7, 14, 21, October 5, and October 12 issues of *Iron Age*. Installment 1 presents the characteristics of those SAE steels most generally used by machine tool builders, and sets forth the effects of various alloying elements on steel. Section 2 gives additional tables and discussions on the steels required by the machine tool builder. Section 3 summarizes a recommended group of steels believed to be suitable for all requirements encountered in most plants. In secetion 4 an outline of the properties which should be definitely specified, and typical purchasing specifications are presented and discussed. A materials inspection program is suggested in section 5, and a code system is given for indicating various grades of steel and heat treatments on records and drawings.

Reprints of the entire article, entitled "Steel Standardization," are available at 15 cents per copy from the *Iron Age*, 239 West 39 Street, New York.

British Standards Institution Defines Its Role in War

"In view of the present national emergency the Chairman's Advisory Committee has felt it right to submit to H.M. Government, the desirability of making the fullest use of this organization (the British Standards Institution) with its specialized knowledge, as a complete unit, in the further coordination of the general supply of industrial materials so urgently required. In the ordinary course of its work, the BSI comes in such close touch with the manufacturers, both individually and through their various trade organizations, that it is in a peculiarly good position to take immediate and appropriate action in regard to any problem which might arise in connection with the supply of suitable materials and component parts as well as to simplify industrial requirements for emergency purposes. . . .

". . . discussions have taken place with the Home Office Air Raid Precautions Department with the result that the British Standards Institution has been authorized to prepare, and issue on their behalf, a special series of British Standard Codes, Specifications, and Schedules for Materials or Appliances required for Air Raid Precaution purposes."—*British Standards Institution Handbook, July, 1939.*

Railroad Association Issues Revised Wire, Cable Standards

The 1939 issue of Specifications for Wires, Cables, and Tapes has been made available by the Operations and Maintenance Department of the Association of American Railroads, to supersede the 1935 edition of the same specifications. The Signal Section of the Engineering Division has charge of this work.

Grain Elevator Explosion Offers Data For Study by ASA Committee

THE disastrous grain-elevator explosion and fire, which caused the loss of nine lives, serious injury to 30 men, and a property loss of about $3,500,000 in Chicago May 11, happened because the elevators were old-style wooden structures to which many of the provisions of the American Standard Safety Codes for Prevention of Dust Explosions could not be applied. This is the conclusion of David J. Price and Hylton R. Brown of the Chemical Engineering Research Division, Bureau of Agricultural Chemistry and Engineering of the U. S. Department of Agriculture, in an article published in the October issue of the Quarterly of the National Fire Protection Association. Dr. Price is chairman and Mr. Brown is secretary of the ASA Committee on Dust Explosion Hazards.

As a result of their findings they recommend that the practice of weighing grain without removing the dust be eliminated and effective methods of dust collection and control be established. They also recommend that a study be made of hazards caused by hot exhaust pipes and mufflers and backfiring of trucks used for delivering grain.

The elevators destroyed in the explosion were built in 1894 and 1895 and were of the old-style metal-clad frame construction with crib bins, the article reports. Many changes and improvements had been made since the buildings were constructed, particularly in providing additional fire protection. Automatic sprinklers had been installed, and provisions made for water curtains.

At the time the explosion occurred, grain which had been held for cleaning was being run through the cleaner into the lower cleaner bin, and from it to the boot of one of the shippers which elevated it for distribution to designated bins.

Trucks May Be Cause

It has been impossible to determine accurately the cause of the explosion, although it has been suggested that it may have been caused by a truck which had completed unloading corn a short time before. A backfire may have ignited dust on a conveyor belt, or foreign material in the corn may have caused a spark when it entered the conveying and elevating machinery, it is suggested. This can not be definitely determined as the cause, however, the report indicates, because the unloading had been completed, the load weighed, and the driver had left the premises before the explosion occurred. It has also been suggested that electric sparks from the motors or starters on the conveyor belts from the truck dump might have been the cause of the explosion.

"The regulations which prohibit the application of suction before weighing grain entering an elevator prevent the elevator operator from providing adequate protection," Dr. Price and Mr. Brown conclude. "Foreign material in grain received at an elevator is frequently of a type which may produce sparks if it enters the grain-handling machinery. Dust accumulated in the grain during previous handling operations must be received into the house with the grain and weighed. It is suggested that attention be given to the possibility of developing some system whereby dust removal during the handling of grain could be under supervision to prevent abuses. Dust could be caught in a bag and the bag included with the shipment where it is necessary to maintain weights. Some provision must be made to remove the incentive for elevator operators to return to the grain the dust removed during handling operations in order to maintain their incoming and outgoing weights. It will be necessary to develop and install effective methods for dust collection and dust control in grain elevators in order to reduce dust explosion losses in this industry. Until this is done it will not be possible to make progress in dust explosion control in terminal grain elevators comparable with what has been already accomplished in the control of the dust explosion hazard in other grain and milling industries."

As for the part that the use of trucks may play in dust-explosion hazards, the following statement is made:

"The increased use of motor trucks for the transportation of grain, and the hazards incident to their operation in dusty atmospheres, emphasize the need for further study of this problem. In some cases it is known that tilting of the truck to unload the grain may cause gasoline to spill from the tank or carburetor. After long runs with heavy loads the exhaust pipe and muffler of trucks may be hot enough to ignite dust. A backfire when the truck is started after unloading would be capable of igniting dust deposits around the dump. If this method of grain handling is used at an elevator, it is recommended that all possible precautions be taken to eliminate the sources of ignition mentioned."

Jones & Laughlin Promotes Use Of Standard Colors for Pipe

A chart, prepared by the Jones & Laughlin Steel Corporation as a means of promoting use of its J & L Pipe, also serves to promote the use of the American Recommended Scheme for the Identification of Piping Systems. This standard, approved by the American Standards Association in 1928, specifies which colors to use on pipes carrying different types of dangerous or valuable materials, or for identifying fire protective systems. The use of standard colors, it is believed, helps to make the pipe easily recognized and to prevent mistakes in identification in case of an emergency.

The chart prepared by the Jones & Laughlin Corporation is intended for distribution to foremen, maintenance engineers, safety engineers, and others responsible for the protection of property, as well as to workmen in industrial plants and buildings. It is designed to hang on the wall for convenient reference.

Copies are available without charge from the Jones & Laughlin Steel Corporation, Pittsburgh, Pennsylvania.

Part of the Jones & Laughlin promotion chart featuring the standard colors approved by the American Standards Association as recommended practice for identifying piping systems

The chart is printed in the appropriate colors as indicated by the color named

Department of Agriculture Announces Food Standards

Standards issued recently for food products under the Federal Food, Drug, and Cosmetic Act were announced by the U.S. Department of Agriculture covering:

Egg yolk, dried egg yolk, frozen egg yolk, frozen eggs, dried eggs, and liquid eggs
Canned tomatoes, tomato puree and tomato paste
Tomato juice and tomato catsup

The regulations covering these standards, which all become effective January 1, 1940, are published in detail in the Federal Register, July 20, July 18, and July 29, respectively. Single copies of the Register can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

Radiator Manufacturers Standardize On 50 Per Cent Fewer Sizes

A reduction of almost 50 per cent in the number of sizes of cast-iron radiators will be brought about through a standardization program approved by manufacturers of cast-iron radiation, the *Official Bulletin* of the Heating, Piping and Air Conditioning Contractors National Association announces in its November issue. The program was developed and sponsored by the Institute of Boiler and Radiator Manufacturers of New York, after a study of requirements of builders and home owners.

More Data in Revised Edition Of Tissue Paper Recommendation

A revision of Simplified Practice Recommendation R46, Tissue Paper, covering wrapping tissue, toilet tissue, and paper napkins, has been completed and promulgated June 15, according to an announcement by the Division of Simplified Practice, National Bureau of Standards. The revision, which is based on data submitted by the Tissue Association, contains more detailed information than the original program. The recommendation now includes data on designation or grade, colors, fiber content, sheet sizes, basis weight, count, wrapping, marking, put-ups and packing. Provision is also made for labeling wrapping tissue.

Until printed copies are available, mimeographed copies may be obtained without charge from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

ASA Standards Activities

EACH month this space will be assigned to the listing of new projects, new standards, drafts of standards submitted to the American Standards Association for approval, or drafts not yet submitted but which are now being considered by ASA committees.

Standards Approved Since Publication of Our November Issue

(The large number of standards approved and under consideration makes it impossible to list in this issue all the standards approved since the last Indexed List of Standards, February 1. The September issue lists all standards approved from February 1 up to the publication of that issue.

(Where price is not shown below, copies of standards were not available at time of publication. Orders will be received by the ASA and filled when copies become available.)

Round Unslotted Head Bolts, American Standard (Revision of B18e-1928) B18.5-1939

Involute Splines, Side Bearing, American Standard B5.15-1939

Taps, Cut and Ground Threads, American Standard (Revision of B5e-1930) B5.4-1939

Weather Resistant Saturants and Finishes for Aerial Rubber Insulated Wire and Cable, American Standard Specifications C8.19-1939

Heavy Walled Enameled Round Copper Magnet Wire, American Standard Specifications C8.20-1939

Approved Standards Available Since Publication of Our November Issue

Viscosity-Temperature Charts for Liquid Petroleum Products (with three charts) (Revision of Z11.39-1937) Z11.39-1939 American Standard $1.00

Standards Now Being Considered by Standards Council for ASA Approval

Welded Wrought-Iron Pipe (Revision of B36.2-1939; ASTM A 72-38)

Lap-Welded and Seamless Steel Pipe for High-Temperature Service (Revision of B36.3-1936; ASTM A 106-36)

Electric-Fusion-Welded Steel Pipe (Sizes 30 in. and over) (Revision of B36.4-1936; ASTM A 134-36)

Electric-Fusion-Welded Steel Pipe (Sizes 8 in. to but not including 30 in.) (Revision of B36.9-1936; ASTM A 139-36)

Proposed American Recommended Practice for the Use of Explosives in Anthracite Mines M27

Safety Code for the Prevention of Dust Explosions in the Manufacture of Aluminum Bronze Powder

Safety Code for the Prevention of Dust Explosions in Pulverizing Systems for Sugar and Cocoa (Revision of Z12b-1931)

Safety Code for Coal Pneumatic Cleaning Plants (Revision of Z12f-1930)

Safety Code for Prevention of Dust Explosions in Wood Flour Manufacturing Establishments (Revision of Z12g-1930)

Safety Code for the Prevention of Dust Ignitions in Spice Grinding Plants (Revision of Z12h-1931)

Safety Code for the Use of Inert Gas for Fire and Explosion Prevention (Revision of Z12i-1931)

Safety Code for Installation of Pulverized Fuel Systems (Revision of Z12.1-1935)

Safety Code for the Prevention of Dust Explosions in Starch Factories (Revision of Z12.2-1935)

Safety Code for the Prevention of Dust Explosions in Flour and Feed Mills (Revision of Z12.3-1935)

Safety Code for Prevention of Dust Explosions in Woodworking Plants (Revision of Z12.5-1935)

Specifications for Sieves for Testing Purposes Z23

Computation of Strength and Thickness of Cast Iron Pipe, Proposed American Recommended Practice A21.1

Specifications for Cast-Iron Pit Cast Pipe for Water or other Liquids, Proposed American Standard A21.2

Specifications for Cement Mortar Lining for Cast-Iron Pipe and Fittings, Proposed American Standard A21.4

Building Exits Code (Revision of A9-1939)

Commercial Standards for Sun Glass Lenses (CS 78-39; CS 79-39)

Rubber-Insulated Tree Wire (Revision of C8.16-1936) C8.16

Standards Withdrawn by ASA

Specifications for Class A 30 Per Cent Rubber Insulation for Wire and Cable for General Purposes (C8.4-1936)

Withdrawal of Project Being Considered

Standardization of Foundry Equipment and Supplies B45

Drafts Available

Allowable Concentrations of Carbon Monoxide, Proposed American Standard

Allowable Concentrations of Hydrogen Sulfide, Proposed American Standard

Allowable Concentrations of Carbon Disulfide, Proposed American Standard

Allowable Concentrations of Benzene, Proposed American Standard